# PRACTICAL HINTS

ON THE

# PHOTOGRAPHIC

# PROCESSES,

ON

# GLASS AND PAPER.

---

By J. B. HOCKIN,

Operative Chemist.

---

PUBLISHED BY THE AUTHOR,

289, Strand, London.

1854.

THIRD EDITION.

# PRACTICAL HINTS

ON THE

# PHOTOGRAPHIC PROCESSES,

ON

# GLASS AND PAPER.

# INTRODUCTION.

Since the appearance of my first Edition treating of the Collodion and Positive Paper processes, which has received at the hands of the scientific public a degree of attention, I, in writing it, scarcely dared to hope; I have been diligently occupied, during my few leisure moments, in experimenting with a view farther to elucidate the theoretical principles upon which success depends in a field so new (and, I must be allowed to observe, so little understood in its chemistry) as Photography.

Certain of those views, particularly that one relating to the influence of an exceedingly, nay, infinitesimally small excess of nitric acid in the silver bath in the Collodion Process, have been arrived at, independently, by other chemical experimentalists, and are now almost generally admitted as true. I have added to the present edition formulæ for, and notes on the Negative Paper and Albumenized Glass processes; and I had hoped to have succeeded in applying to them the same principles which, to the chemical enquirer, are so very beautifully apparent in the Collodion process; but my daily avocations so occupy the available period of light, that I have not hitherto succeeded in so doing.

The Collodion process now leaves scarcely any thing to be desired; with ordinarily good light and a double achromatic lens, (the proper approximation to neutrality in the silver bath being observed), the exposure is instantaneous. But in the Paper processes much still remains to be done; the Collodion plate may be kept in an excited condition several hours with but little loss of sensitiveness, and I see no reason why the paper, being treated on the same chemical principle, should not be brought up almost to a similar degree of efficiency and sensitiveness.

# On the Applications

OF

# PHOTOGRAPHY.

---

## ERRATA.

Page 33, top line left out.

---

If the finished proof present numerous large transparent spots

application of the principle of this art has been made by our Gallic neighbours, who are ever so keenly alive to every means of extending works of art; it consists in obtaining fac-similes of rare engravings.

It is well known that the etchings of Rembrandt, Callot, the engravings of Albert Durer, Raimondi and others, are highly prized by amateur collectors; a single impression of one of their plates is often a matter of persevering assiduity, and of ex-

# On the Applications OF PHOTOGRAPHY.

THE applications of Photography, already numerous, are constantly extending into new and unexpected channels; and although the most popular at present, and likely to remain so, is that of taking portraits and landscapes, there are other directions in which it may be employed, doubtless no less interesting and useful.

## COPYING ENGRAVINGS.

A very extensive and most valuable application of the principle of this art has been made by our Gallic neighbours, who are ever so keenly alive to every means of extending works of art; it consists in obtaining fac-similes of rare engravings.

It is well known that the etchings of Rembrandt, Callot, the engravings of Albert Durer, Raimondi and others, are highly prized by amateur collectors; a single impression of one of their plates is often a matter of persevering assiduity, and of ex-

pense to obtain, and anything like a complete collection of the productions of any one of these artists is only possible to the wealthy; but the taste for these things is not confined to that class, and the gratification hitherto the privilege solely of the possessor of wealth, is now, through the appliances of Photography, extended to a large class of amateurs; facsimiles of works worth many pounds can now be obtained for a few shillings, nay, even pence.

And this multiplication of these choice works in no way impairs their integrity, or depreciates their value to the possessor, they are still as highly prized as ever; but the pleasure and gratification they are capable of affording, is widely extended, and with it increased knowledge and taste for works of art.

The process of multiplying fac-similes of engravings is exceedingly simple.

As the engraving only admits the light to pass through those portions of the paper left uncovered by the ink, of course the first impression obtained from it on sensitive paper is a negative, but like other negatives any number of positives may be obtained from it, and in this manner the portfolios of the collector may be enriched with productions, which, but for the aid afforded by Photography, would never have found a place in it.

### COPYING PAINTINGS AND SCULPTURES.

Another application to the fine arts consists in copying paintings and sculptures, which have not been engraved; in this manner an artist can communicate to a distant patron or friend, an accurate idea of a work upon which he is engaged, or which he has to dispose of.

### COPYING BOTANICAL SPECIMENS, &c.

In its applications to natural history, Photography possesses strong claims to our attention. By simple super-position on sensitive paper of numerous specimens from the vegetable kingdom, we may obtain much more minute and perfect delineation than lies within the power of the draughtsman or engraver to represent. Every vein, branchlet, and filament is produced with a degree of accuracy only evident under great magnifying power. And when the microscope itself is subtituted for the Camera, a new world of wonders is placed within our reach, the novelty of which may at first blind us to their singular interest and value.

### MICROSCOPIC OBJECTS.

That we should be able to obtain permanent fac-similes of objects as they appear under strong magnifying power, is a resource that opens a wide field for illustration in many departments of science, which has already

been cultivated to some considerable extent, and which only requires to be better known to be more fully appreciated.

The Telescope also is made to register its wondrous discoveries, very perfect views of the moon have been obtained, and their accuracy is so great, that the pictures bear being magnified to twenty feet in diameter, in the oxy-hydrogen microscope.

## STEREOSCOPIC VIEWS.

The invention of the Stereoscope would have been devoid of half its value had it not been for the aid brought to it by Photography. To obtain subjects by the ordinary resources of art, possessing that mathematical accuracy of delineation requisite to exhibit the optical phenomena for which the instrument was contrived, was impossible; but when the objects delineate themselves through the lens of a Camera upon glass or polished metal plates, we attain not only the requisite accuracy, but the most wonderful delicacy of detail. It is scarcely possible to imagine anything more surprising than the illusion produced in these Stereoscopic views, which baffle all *a priori* reasoning. Whether portraits or perspective views, the effect is the same, the plane surfaces assume

the appearance of a solid form, standing out in full relief, with ample distance behind, and atmosphere around, so that it becomes exceedingly difficult in this case, as in many others, to believe one's eyes.

## APPLICATIONS OF PHOTOGRAPHY TO SCIENTIFIC PURPOSES.

A knowledge of the laws of aerial and terrestial phenomena has of late years assumed a higher position in the estimation of the scientific world than formerly, and the necessity for an accurate *continuous* record of the fluctuations shown by the instruments employed was a great desideratum: As the observations required to be made at very short intervals during the day and night, the post of the observer was one of great responsibility and care. The self registering apparatus of Mr. Charles Brooke is based upon the principles of the photographic art; by it all the variations in the barometer, thermometer, hygrometer, magnetic needle, and other delicate instruments employed in the observance of meteorological phenomena are recorded in the minutest degree, or rather they record themselves, and the presence of an attendant is only occasionally requisite to renew the photographic paper.

The mode in which this result is effected may be explained by showing its application to recording the fluctuations of the barometer and thermometer.

A quantity of sensitive paper rolled round a cylinder, moved by clockwork, is made to pass behind the glass tube of the instrument at a given rate of speed; as each fluctuation of the mercury shuts out or admits a greater or lesser portion of light to pass through the upper part of the glass tube containing it, so will the photographic paper be acted upon by the light, and exhibit, in a curved line, those successive fluctuations which can be accurately referred to the exact moment of their occurrence by the connection established with the clock work.

By other contrivances, not easily described, the variations in the most delicate instruments are recorded: the direction and force of the wind, the amount of rain also, and the varying intensity of diffused light during the day, are all capable of being depicted on the sensitive paper.

The recent improvements in Photography have brought the art to that state of perfection that *time* has no longer become an element of success or failure, as was formerly the case. Instantaneous exposure of the sensitive surface is sufficient, for the developing agents do the rest. Even machinery in motion, falling water, moving vehicles,

or the clouds, are produced in complete integrity.

It is well known that drawings of complicated machines require a vast amount of skill and labour for their production; a few minutes with photographic appliances accomplishes all this labour at a trifling expenditure. Photographs have frequently been brought as witnesses or evidence into our judicial courts: the fearful wreck too often following upon railway collisions, frequently forms the painful subject of Photographic pictures, which also sometimes throw much light upon the cause of a disaster.

From what has been said, it is apparent that either with or without the aid of a Camera, Photography may be made available for the purposes of amusement and instruction; affording a most delightful recreation to those possessing the necessary leisure and taste, and acting as an useful ally to the observer of the phenomena of nature.

Every object of nature and art may be called into requisition, and at the present time when a taste for art seems extending on all sides, there could not have been anything discovered better calculated to advance the progress of that taste. The absence of colour in the product of Photography is rather an advantage than otherwise, for they will contribute the more to the better

education of the eye for *form*, than if coloured. Colour, by imperfectly educated artists, is too often employed to conceal the defects of their drawing.

### PORTRAITS AND LANDCAPES.

It is scarcely necessary to enlarge upon the applications of Photography to portraiture and views, its productions are now so abundant that they speak for themselves. We may remark, however, that while the absence of colour in these is so much regretted, it would be more reasonable to regard them in the same light as engravings, which, in the eyes of the enlightened amateur, have qualities which make them fall very little short of pictures; they always give the painter's *idea*. In Photographic portraits, taken with true artistic feeling, there is as much *colour* as we usually find in the portraits of Rembrandt or Titian; a simple crayon sketch of Raphael's is worth a whole gallery of gaudy ill-drawn figures, exhibiting a hardy defiance of anatomy, chiar-oscuro and perspective.

Much has been said respecting the injury Photography may inflict on the artist. These fears are altogether groundless; the true artist can derive nothing but benefit from the valuable assistance it will lend him in making numberless sketches, and furnishing him instantaneously with details of drapery,

which, to have had to study, would have wasted his energy, and perchance deprived us of some bright poetical inspiration. Let the young artist however beware that, although Photographic sketching may educate his eye for the beautiful, it does not supply that facility of hand, without which he must not hope to emulate the ornaments of his profession. The class who will suffer are the shilling picture makers—these we truly congratulate, they can embrace a more profitable calling.

# Photographic Process
ON
# COLLODIONIZED GLASS.

## CHAPTER I.

### APPARATUS.

The instruments required are not numerous, nor are they necessarily expensive; they consist of—

THE CAMERA, a box, blackened internally, the most convenient form of which, the Sliding Camera, consists of two portions, the front being the larger; the posterior portion has in it grooves wherein slide the frame holding the ground glass for *focussing*, and the *dark slides* for holding the prepared plate. It is of the highest importance that these various pieces have their *working portion* in the same vertical plane, and be capable of preserving this coincidence unimpaired; to this end, they must be made of perfectly seasoned wood, by the best workmen. The anterior compartment has its front pierced in the centre with a hole through which passes the brass tube, carrying the

LENSES These should be Achromatic, *i.e.* composed of two varieties of glass of differ-

ent refractive powers, in order to produce coincidence of the visual and actinic rays of light.*

*A single combination* (vulgo single lens) is best adapted for landscapes, from the fact that time of exposure is here rarely an object.

The *double combination* (double lens) is used for portraiture; its focal distance being one-half that of the former, necessarily diminishes the time of exposure, by concentrating the luminous image within a smaller space; and, for objects lying all nearly in one vertical plane, it may be used without the *stop or diaphragm:* the single lens always requires this to be used, to counteract the *spherical aberration* which is inherent in it, and which produces distortion of the image, commencing a short distance around the centre. Owing to great facility in obtaining good optical flint and crown glass, and the great attention paid, of late, to the manufacture of lenses, they may now be obtained of very excellent quality in every respect, at one-third the price still charged by some makers.

* The *visual rays* of light are those which impress the eye with the sense of color: the *actinic* are those active in producing the effects we are about studying in Photography; and, as they lie at the extreme of the visible spectrum, and are, consequently, highly refrangible, were the lenses not achromatic, we should require a correction for every fresh distance between the object to be copied and the Camera.

The lens, and in this term we usually comprehend the brass fittings, &c., should be furnished with a "rack and pinion" movement, for the purpose of procuring great accuracy in the focussing, this being scarcely attainable by sliding the Camera body. It will also be advisable to get the double combination provided with a set of diaphragms (discs of various apertures, from three-eighths of an inch upwards), for the purpose of enabling it to take in various planes, and thus give us the effect of perspective; they are also useful in diminishing the amount of light, and thus increasing the time of exposure, as, in the Collodion process the plate is so sensitive that it is difficult to estimate the minute fraction of a second, necessary for taking a picture; in fact, the hands are frequently unable to uncover and again cover the lens before the result is spoiled from over exposure. The diaphragm usually prolongs the time in the *inverse ratio* of its own area and that of the full aperture of the lens; they should be placed *between* the two lenses of the double combination, and *in front* in the single.

THE TRIPOD STAND serves to support the Camera at the medium height of the eye; this form is most generally used, combining, as it does, lightness and great rigidity, the latter, an absolute requirement.

Beside these, a vertical glass, or gutta percha trough, to contain the Nitrate of Silver solution, a level stand, some graduated measures, scales and weights, a few stirring rods, funnels, glass-stoppered bottles, and glasses cut to size (out of No. 1 patent plate), together with three cloths, are all the apparatus absolutely required in the Collodion process. Some small pieces of apparatus will be found in the catalogue, which serve to facilitate manipulation, but they can be dispensed with.

---

## CHAPTER II.

### CHEMICALS.

These are few in number, but require the utmost nicety in their preparation. I should advise beginners not to attempt their manufacture until they are well acquainted with the chemistry of the subject, and the phenomena occurring in the process. That one on which much depends is the

IODIZED COLLODION, a liquid which consists of a modification of gun cotton (Xyloidine) dissolved in Alcoholized Æther, together with an alkaline or other iodide. A good Iodized Collodion should possess the following properties:—it should be either colorless or tinged only a pale straw, and be capable of maintaining this for at

least a week or ten days; those which change color rapidly are to be avoided, as their action becomes very unequal. On being poured over a glass plate, and allowed to *set slightly*, it should be sufficiently tenacious to bear being peeled off the plate in moderate sized pieces, and should, when dry, present a film perfectly transparent, and not visibly reticulate.

## THE SENSITIZING AGENT.

| | | |
|---|---|---|
| The Nitrate of Silver Bath. | Crystallized Nitrate Silver, | 5 Drachms |
| | Distilled Water | 10 Ounces. |
| | Dissolve and add | |
| | Iodized Collodion | 2 Drachms |

Shake these together at intervals for an hour, allow them to repose twelve hours, and filter through paper.*

The object of adding Iodized Collodion is, in the first instance, to saturate the liquid with Iodide of Silver; this might be effected by the addition of the Iodide direct; it was found however that the bath thus constituted failed to produce its best effects until it had been some time in use; I therefore added Collodion, and, since this, have never found a bath fail in working satisfactorily,

* A filter should be kept for this purpose in a funnel covered with a glass plate: silver solutions in general are more or less contaminated by passing through a new paper filter.

when first tried, *provided the following observations had been attended to*:—the Silver bath should be as nearly neutral to test paper (blue litmus) as is possible without being absolutely neutral; the excess of acid (nitric) necessary being no more than from five to ten-hundredths of a minim per imperial pint of solution; this is indicated if a piece of the above paper, on being agitated with a considerable portion, change color slightly within thirty seconds, and become of a decided claret within one minute, or one-and-a-half. Upon strict attention to these re-actions depends, to a great extent, success in practising the Collodion process; the careful operator will test his bath in this manner every morning before commencing work. If it be found to have become somewhat less acid, the best remedy will be the addition of half-an-ounce of a solution of Nitrate of Silver, containing *forty grains* per ounce; this material, in crystals, always contains some free acid, and thus serves to restore the state of equilibrium; the intention of adding a forty-grain solution (the bath only containing thirty per ounce), is to compensate for the greater loss of silver than of liquid.

A plan I have long followed, with considerable success, is always to return my bath into the stock-bottle after using, and supply the deficit by a forty-grain solution,

acid if required, or neutralized by the careful addition of Ammonia, if not so.*

It will be observed that I always speak of Crystallized Nitrate of Silver, the fused material of commerce should *never be employed*, it is always either wilfully adulterated, or it is contaminated by Nitrite of Silver, acquired during the act of fusion. I have enlarged on these *apparently* trivial points, from the knowledge that a large amount of the insuccess, of both amateur and operator, is distinctly traceable to their non-observance. I first had the honor to draw attention to the necessity for a slightly acid condition of the bath, and have since had the pleasure to see my views fully confirmed by Mr. Fenton and other gentlemen, who arrived independently at the same conclusion. At the risk of being thought tedious, I will beg to be allowed once more to observe; *an Iodized Collodion, in color not beyond a pale straw, (when deeper it is not trustworthy), should be used in conjunction with a bath containing a barely appreciable trace of acid in excess.*

In describing the manipulation, I shall return to the phenomena occurring with an acid, neutral, and alkaline condition of the bath.

* It is convenient to keep a small quantity of both Ammonia and Nitric Acid, diluted with ninety-nine times their volume of water, to rectify any too marked acidity or alkalinity of the Silver bath.

The picture is *latent* on the plate being taken from the Camera, it requires to be rendered visible by pouring on the plate one of the following

## DEVELOPING AGENTS,

FOR NEGATIVES.

**Pyrogallic Solution.**
- Pyrogallic acid 3 grains,
- Glacial acetic acid 1 drachm,
- Soft water 4 ounces.

FOR POSITIVES.

**Proto-Nitrate of Iron.**
- Proto-sulphate of iron 140 grains,
- Distilled water 3 oz.,—dissolve,
- Nitrate Potash pure, 102 grains,
- Distilled water 3oz.,—dissolve.

Mix the solutions and add

Glacial acetic acid 2 drachms.

**Or, Proto-Sulphate of Iron.**
- Proto-sulphate of iron 10 grains,
- Distilled water 1 ounce,
- Glacial acetic acid 20 minims,
- Dilute nitric acid 20 minims.*

All these solutions, except the Silver bath, should be made in small quantities at a time, as they do not keep well.

## FIXING MATERIALS.

**Hypo' Solution.**
- Hyposulphite of soda 2 ounces,
- Soft water 5 ounces.

**Or,**
- Cyanide of potassium 5 grains,
- Soft water 1 ounce.

The Hypo' should be carefully kept at a distance from the other chemicals, the slightest trace of it in them would infallibly spoil them. If the hands, after using it, be wiped on one of the *three cloths*, or if they only touch them, it will be perceived upon

* Vide page 20.

the picture in the form of *dirty "smears"* between the glass and the film.

The Cyanide is also useful for removing the silver stains from the hands or linen; the only care necessary in using it is not to employ it except on the hands, where the skin is hard, and to avoid its entering a cut or wound.

It is infinitely preferable to the Hypo' solution, it does its work more quickly, and is more easily removed during the final washing of the plate.

---

## CHAPTER III.

### THE DARK ROOM.

It is indispensable, in all Photographic operations, to have a room from which white light can be altogether excluded. We may either entirely exclude daylight, and use a lamp with a yellow shade, or, which is preferable, cover the windows with several (three or four) folds of orange colored calico, or a sheet of India rubber, $\frac{1}{32}$-inch thick; the light which passes through these is entirely deprived of all actinic rays. I have used the latter in a Camera I have constructed, for developing pictures out of doors, with the happiest effects, never having found the strongest sunlight prejudice the opera-

tion. I am not, however, prepared to say what might be its effect if the exposure were long continued. I believe the Photographic world is indebted to Mr. Wilkinson for this application.

The dark room should be furnished, if possible, with a sink and a plentiful supply of water; if, however, these be not attainable, a jug and basin will serve instead; common water answering all purposes after the developing has been effected.

## THE OPERATING ROOM.

The professional Photographer must provide himself with a room with a glass roof, and *at least, one side* of the same material, choosing, in preference, a northern aspect; the glass must be covered with blinds so adjusted as to shut off or admit light, as it may be desirable. He will also provide himself with moveable back grounds, composed of canvas stretched on a frame, painted in flat grey tints, containing more or less black according to the requirements of the subject, dark figures and draperies requiring of course the warmest tones.

The Amateur will most likely operate most of his portrait taking in the open air; a yellowish blanket will form an admirable back ground for his purposes. The sitter

must be placed out of the *direct* solar rays, and if the light be excessive, he must be screened therefrom by a brown holland, or blue shade stretched some two feet over his head; light coloured materials spread near his feet will obviate the strong dark shades projected by the more prominent features. As a general rule, direct light is not necessary, plenty of diffused light is what we require, it is thus that we so seldom succeed in taking a good portrait, in ordinary rooms, the only light then obtainable being that coming *direct* through the window, that which is diffused, losing the actinic rays from the more or less yellow tone of the walls and draperies. If the experiment be made in an ordinary room, place the sitter some feet from the window, place a white cloth near the feet, and a white screen in such a position as to reflect a good light on the shaded side of the person; if there be a second window. the light therefrom must be prevented from falling on the eyes of the sitter.

The light reflected from masses of white cloud, possesses the largest amount of *actinic* power, that emanating from a clear blue sky, comparatively little, being *polarized*; it is from this cause that the results under the cloudless skies of the East are by no means so satisfactory as could be desired. From what is above stated, (page 15) relating to the position in the solar spectrum of the

actinic rays, it will be readily understood that the colours do not produce their relative optical effects in the Photographic picture, those from the red end up to the green are comparatively black, even in their light tones, and the darkest tone of blue produces an effect almost similar to a yellowish white. Rays of light however falling on variously coloured objects at a certain angle of incidence, produce an effect much more nearly approximating the visual; this is known to a few who are principally engaged in the reproduction of coloured pictures, but has not to my knowledge been sufficiently investigated by those capable of thoroughly appreciating the laws governing this phenomenon, or willing to make public the results they have obtained.

It might have been expected that greater appreciation of colour would have resulted from the use of Bromides, but I have found no better, nay not so good a result from their employment as from the use of simple Iodides.

Landscape like portraiture is best undertaken when the sky is somewhat clouded, and the sun obscured by large masses of white cloud.

## CHAPTER IV.

CLEANING THE PLATE.—Remove all the mechanical impurities by water and friction, then pour over the plate a small quantity of the Cyanide solution (page 21) wipe this duly over both sides, then rinse it off with an abundance of water, and leave it a while to drain until all the glasses required have been so treated; again, rinse with clear water and wipe with the cloth kept for this purpose, finish the drying by means of a second cloth, and finally polish with the third, this latter may be replaced with advantage by a piece of wash leather freed by washing from the chemicals used in its preparation. A number of plates may be thus prepared in readiness for use

COATING THE PLATE.—See that it is free from dust or visible contamination. Hold it by one corner, between the thumb and finger of the left hand. Remove the stopper from the Collodion bottle by the little finger of the same hand, and cleanse the mouth of the bottle from any dry material which there accumulates, as, falling on the plate, it would produce spots technically termed

"comets." Pour on to the centre of the plate as much Collodion as it will hold; then cause it to flow successively to each corner, avoiding the thumb; finally, pour off into the bottle *at the right hand corner nearest the body*, keeping up an oscillatory motion until it ceases to drip. Replace the stopper, keeping the glass in the same nearly vertical position, and proceed to immersion in the nitrate bath contained in the dark room. This must be done boldly and without stopping, as each rest produces a streak across the plate. After being immersed fifteen seconds, move it up and down several times, and allow it then to repose for *two minutes*. It will be seen to have become a rich creamy yellow, if the proper temperature of the room (at or over 60° Fahrenheit) be observed. Now repeat the up and down movement until the liquid flows uniformly over the surface, all trace of oiliness being lost, and the plate is ready for transference to the *dark slide*. If kept much longer in the bath than the above time, some portion of the sensitiveness is lost. The *excited plate* should be exposed in the Camera with as little delay as possible; if it dries, it is entirely useless: under ordinary circumstances, ten minutes is the longest time it will retain its sensitiveness. If more than five minutes elapse it will be necessary to re-dip in the silver bath ere we proceed to develope. Many are in the habit

of draining the plate on blotting paper before placing it in the dark slide: if this be done it must be thoroughly effected, it requires at least a minute.

"Archer's Bath," a wedge shaped vessel of plate glass, effectually obviates these inconveniences, as the plate is impressioned during its stay in the bath, and may be kept hours both before and after exposure. Of course I must not be understood to mean that the film is all this time soaking in the liquid, it is withdrawn from its influence by being placed, after due immersion, in contact with the vertical front of the vessel.

Focussing. The accessories of the picture, if a portrait, having been previously arranged, place the sitter in such a position that as much as possible of the figure may be in one vertical plane, all parts nearer the lens than this are magnified, those more remote diminished, and both out of focus, known by their outline appearing indistinct ("flou.") If it be required to take an exaggerated position, such as a fencing attitude, a diaphragm must be used, as it must also in landscape where great distance occurs between the front and back-ground.

Draw out the sliding portion of the Camera until the image appears on the ground glass, then fix the screw and complete the perfect adjustment by moving the milled head

attached to the lens. It is usual in portraiture to focus on the eye or the face generally. The Camera should be placed horizontally, the tripod being raised or depressed so that the picture may always occupy the centre of the field.

The right focus being obtained, put on the cap of the lens and replace the focus-glass by the slide containing the prepared plate, draw up the shutter and proceed to—

THE EXPOSURE TO THE LUMINOUS IMAGE. You effect this by directing the sitter to keep the eye fixed upon a certain spot previously arranged during the focussing, then requiring absolute immobility, take off the cap during a period varying from one to two seconds in a good light to a minute or more in dark weather. Experience only can determine this. Replace the cap, close the shutter, and take the slide to the dark room

## TO DEVELOPE.

The beginner should commence by using Pyrogallic solution both for positives and negatives; the time of *exposure in the Camera is the same for both;* this solution brings out the picture (latent on the plate when taken from the Camera) more slowly than the Iron solution, and I therefore recommend the the Tyro to begin by using it.

Hold the plate by the corner denuded of Collodion, or place it on the level stand, and pour quickly over it the requisite quantity of the above solution, (a plate 5 in. by 4 in. will take 3 drachms); it will be observed not to flow uniformly, you effect its due diffusion over the plate by pouring off into the measure, again pouring on, and if necessary, repeating the operation. The first effect is the appearance of the high lights, these, if the plate has had the right exposure to luminous influence, are soon followed by the half tones, and quickly afterwards by the lowest tones—the shades of a black coat for example: when the latter appear, a stream of water is to be directed over the surface to wash off the developant and stop farther action; the result is a *positive picture.*

If, however, a *negative* be desired, the development must be continued until the plate, held over a piece of white paper, or viewed by transmitted light, exhibits a tendency to become opaque in the high lights; or until the liquid on its surface is very highly coloured and muddy. It must now be *washed off* as in the former instance, and *fixed* in the manner to be presently described.

The Proto-nitrate of Iron produces a better toned positive picture than the Pyrogallic solution, but as it developes more quickly, it is rather more difficult to use. Place the picture on the level stand, pour thereon

*quickly* as much solution as it will hold, and immediately taking up the vessel holding the wash-water, dash it over the plate *as soon as the tones next above the lowest are visible.*

N.B. The developing solutions should never be preserved for use a second time, they have done their work and are almost, if not entirely, decomposed.

### FIXING THE IMAGE.

Free the picture by a plentiful stream of water from the remaining developant, and pour over it the Cyanide solution, allow it to rest until all the opalescent appearance, occasioned by the undecomposed Iodide of Silver, disappears: well wash by a plentiful effusion of water, and let it dry spontaneously, or by the aid of a spirit lamp.

### VARNISHING.

The proof being dry is liable to injury from friction, and even from atmospheric influences. It is rendered permanent by the application of a varnish; that composed of Amber and Chloroform is the only one entirely free from objections. It is poured over the plate in the same manner as the Collodion, drained off into the bottle *without any rocking* of the plate, and within half a minute becomes perfectly dry and hard, in

cold or moist weather it may be desirable to hold it near a fire for a few seconds.

The positive picture being now backed with a piece of black velvet, or what is better, with black varnish, presents a very brilliant appearance, quite equal in detail to a Daguerreotype, and without its unpleasant glare; it is also *non-inverted.* The negative without further preparation will serve to produce an almost unlimited number of copies, in the manner to be hereafter described.

In treating of developing the picture, I have supposed that the right exposure has been hit. I will now enter a little farther into details thereon, but must first endeavour to explain the terms, "*negative*" and "*positive,*" this is difficult, nay almost impossible to do absolutely.

On holding a *positive* over a black surface, the details of the picture come out in the natural position, with respect to light and shade; those parts effected by the former, being metallic silver, *reflect white light.* On examining it by transmitted light, the lights appear more or less *black,* but very translucent; the shades are represented by *perfect transparencies.* The *negative,* on the contrary, viewed by reflected light, presents a perfectly confused picture; the lights are *white patches,* the shades *grey* ones.

the Cyanide used in cleaning the plate was not sufficiently washed off ere it was dried; if dirty streaks and smears appear on the glass beneath the Collodion film, the glass was not sufficiently cleaned; developing with the iron salts has a great tendency to produce the latter defects. Spoiled proofs should not be allowed to dry, they may be thrown into a vessel of water, and cleaned with Cyanide on the earliest occasion.

The picture being "piquée" all over indicates that the Collodion has not been allowed to settle sufficiently after being iodized, or that the deposit therefrom ensuing has been again shaken up with the liquid, this defect sometimes arises also from the working bottle containing too much Collodion, the dust acquired during its very repeated sojourns on the plates accumulates largely. It is desirable to work from a small bottle, replenishing it frequently from the stock bottle, which should contain sufficient Iodized Collodion for several days work.

I have endeavoured in the foregoing pages to give as accurate an idea of the Collodion process, as I conceive possible. I am far, however, from flattering myself that I have succeeded in indicating it so perfectly as that the Tyro will be enabled to put it into practice, without an ocular demonstration; this I am willing to afford to all purchasers of apparatus, and I indeed think it is no more than they have a right to expect from all vendors.

# PART SECOND.

## POSITIVE

## Photographic Process;

OR

## PRINTING FROM NEGATIVE PICTURES.

### APPARATUS.

Three glass or porcelain dishes, some pins bent like **S**. Two glass rods, a quire of white blotting paper, and the

### PRESSURE FRAME.

A rectangular frame of wood with a rebate, serving as a support to a thick glass plate, backed by the pressure board, consisting of three pieces hinged together in such a manner that the outside thirds may be individually lifted without disturbing the remainder. The pressure is obtained by two screws working through cross pieces fitted into, and sliding in grooves in the frame.

Procure some fine close-grained, even-textured, satin paper, (many excellent qualities are now in the market, Towgood's is the best I have yet found,) immerse it a sheet at a time in

SALTING SOLUTION. { Muriate of ammonia 100 grains,
Distilled water 10 ounces.

by carefully laying down at first the edge, and gradually extending the whole sheet into contact with the fluid surface, avoiding the enclosure of air bubbles, causing the liquid then to flow over the upper part by drawing a glass rod or a brush over it; repeat this with each sheet until a dozen are immersed. Turn the mass of paper over, pick out the bottom sheet (now uppermost,) and attach it by the bent pin by one corner to a line, and so on with the rest.

When dry, brush each sheet over with a silk handkerchief, to remove any crystals of the salt, and preserve in a portfolio labelled, SALTED PAPER. This keeps indefinitely. By replacing one-third, or half the water, by the white of fresh eggs, beating up well, and after allowing twelve hours' repose, straining through cambric, we obtain the liquid for Albumenizing Paper; in this however, the paper must not be soaked, one side only is to be floated thereon; but there are so many difficulties attending its preparation, that the Amateur will find it more economical to purchase it. It is furnished in commerce of a very superior quality, and at a very moderate price.

A few hours before it is required for use, take each sheet of salted paper, ascertain its *right side*, *i.e.* that on which the wire marks are least apparent, and mark it in the corners

with a pencil; take it into a dark room and *float* on the surface of

THE SILVER SOLUTION. { Nitrate of silver, crystallized, 4 drachms,
Distilled water 4 ounces.

carefully abstaining from wetting the back; when the paper loses its rigidity (usually in about three or four minutes) take it out, pass a pin through one corner, and hang it to dry on a line, attaching a piece of blotting paper to the inferior angle. Few sheets must be prepared at once, as they will not keep many days, even though preserved in a close dark portfolio. This constitutes the NITRATED OR POSITIVE PAPER.

The Albumenized Paper is excited in a similar manner. The Nitrate of Silver solution used in this process should be excluded from white light, and only made in small quantities, it speedily becomes brown from use, and tinges the whites of the proofs yellow.

The best method of restoring it is to evaporate it to dryness, fuse the salt, and, dissolving it in pure water with a little Nitric Acid, again evaporate to dryness.

## PRINTING.

Place the negative with its back on the inside surface of the glass plate of Pressure Frame, cover it with a piece of positive paper marked side downward, and interposing

between it and the pressure board three or four thicknesses of flannel, press the whole into contact.

Turn the surface of glass plate now upwards in such a way that the rays of light fall perpendicularly on it, and leave it until a small portion of the paper (left purposely uncovered) assumes a dark maroon tint; then lift one portion of the pressure board and see if the high lights are sufficiently printed. You judge this by their presenting a tint many shades darker than they ought to remain in the finished picture.

Remove now to the dark room, and immerse quickly in the

TONING BATH.
- Hyposulphite of soda 2 ounces,
- Blackened chloride of silver 30 grains,
- Iodide silver 5 grains,
- Soft water 12 ounces.

If you desire brown or bistre tones, but if black or purple blacks, add,

- Chloride of gold 6 grains,
- Distilled water ½ an ounce.

cautiously poured drop by drop into the first liquid, kept stirred. The first effect is to whiten the lights rapidly; if, however, it be sufficiently *printed* in, these whiten gradually, and the dark tones increase in depth and beauty of detail; when the desired tint is reached, take out, wash in a stream of water, and soak for ten minutes in the

FIXING BATH.
- Hypo' 1 ounce,
- Water 8 ounces.

The chemical theory of the toning process not being as yet well understood, some uncertainty exists in procuring any desired tint; as a general rule, the deeper the picture is printed by exposure to light, the longer does it require to remain in the toning bath, and consequently the nearer black are the tones. A temperature of 80° to 90° Fahrenheit greatly facilitates the operation. Albumenized Paper produces a finer detailed image, but the whites are apt, during a long toning, to become tinged with yellow.

The newly made toning bath never gives very fine dark colours until it has been used some few times, when it becomes invaluable. After using, it should be returned into the bottle, and the loss made up from the *fixing bath;* thus treated it will serve for an almost indefinite period; if the gold be used, some little must be added from time to time. When very dark colours are desired, the proof must be greatly over printed, and thus, as above observed, there will be great tendency to yellowing of the whites, this may be obviated by washing in water, and plunging it for five minutes in the fixing bath, before submitting it to the toning. It is perhaps scarcely necessary to remark that the subsequent use of the fixing bath is here as necessary as in the former case, its object being to free the proof from certain salts of silver, which would otherwise remain and

produce that fading of the picture, which many Photographers have had such cause to deplore. The addition of a few drops of acetic acid to the toning solution, has frequently the effect of quickening the production of dark colours, but I do not recommend it, its ultimate action is to eliminate sulphur within the tissue of the paper, and this, is an agent, very likely to produce mischief sooner or later.

The toned and fixed proof is now to be washed on both sides in a stream of water, then allowed to soak in a large quantity for half an hour :—after twice repeating the streaming and soaking, the picture may be dried between blotting paper, and finished by passing a hot iron over it.

Many operators are in the habit of allowing their proofs to soak in water for several hours; I find the above *thrice repeated* washing and soaking much more effectual in freeing the pictures from the chemicals employed in their production, and have not hitherto had to lament their fading from want of care in this respect.

# PART THIRD.

## Photographic Process ON NEGATIVE PAPER.

THIS resolves itself into two distinct heads, viz.: the Calotype or Talbotype, and the Waxed Paper Process; for the former it is necessary to employ English paper only, of which there are now some excellent varieties in the market; for the latter French paper, being sized with starch, is more suited—that made by Canson Fréres is the best. In choosing them it must be borne in mind, that as the pictures when produced are to be used for printing from, like the pictures on glass in a former section, only such sheets can be employed as do not present any defined grain on being examined by being held between the eye and the light, otherwise the grain would imprint itself upon the positive copies, and in the majority of instances, greatly deteriorate the effect.

### THE CALOTYPE.

Various modifications of Mr. Fox Talbot's original method have been devised, the

following appear to give the best result. The first and most important step is to produce what is known as *Iodized Paper*, i.e., paper on the surface of which is deposited a perfectly even coating of pure Iodide of Silver, this is effected either by the Single Wash or by another method, both which we shall now describe.

### To Iodize Paper by the *Single Wash*.

IODIZING SOLUTION. { *Moist* Iodide of Silver 83 grains, *Pure* Iodide of Potassium 650 grains, Distilled water, 4 ounces.

Dissolve the Iodide of Potassium in the water, then add thereto the Iodide of Silver, and stir until complete solution is effected; should the Silver not entirely disappear, add a few more grains of Iodide of Potassium, and filtering it into a clean stoppered bottle, preserve for use. The *moist Iodide of Silver* is prepared by dissolving separately each in four ounces of distilled water, 60 grains of Nitrate of Silver, and 60 grains of Iodide of Potassium, and *pouring the former solution into the latter* constantly kept stirred; keep up the agitation until the liquid becomes bright, then allow the deposit to subside, pour off the supernatant liquid, add four ounces more distilled water, again agitate it and allow to subside; after repeating this operation four times, the *precipitate* is sufficiently *washed*, and when drained thoroughly is fit for use.

This operation should not be performed in a strong light.

Mark the smoothest side of your paper in two or more of the corners with a black lead pencil, float each sheet on the Iodizing liquid, until it lies quite flat, take it out and suspend to a line by a bent pin.*

After treating a dozen papers in this manner, immerse them all, commencing with that first dipped, in a quantity (say $\frac{1}{2}$ inch to $\frac{3}{4}$ inch in depth,) of *rain or distilled water if procurable*, shake them frequently, and pouring off the water after an hour's immersion, add some fresh, repeat this operation for several consecutive hours, until all the soluble salts are removed, then dry. The Amateur would do well to purchase this at first, the difficulties attending the manipulation are great, and success in the subsequent processes depends in a great measure upon their being *perfectly conducted.*

Thus prepared, the *Iodized Paper* will keep in a portfolio for many months. Another method of Iodizing:—

| | |
|---|---|
| CYANO IODIZING LIQUID | Moist Iodide Silver 125 grains,<br>*Pure* Cyanide Potassium, about 100 grains,<br>Distilled Water 4 ounces. |

* This part of the operation is facilitated by turning up half an inch of one edge of the paper, to prevent its coming in contact with the liquid. Great care must also be observed in the placing on the surface of the solution, to avoid including air bubbles.

Add the water to the Iodide and continue adding the Cyanide dissolved in very little water, until solution is nearly effected, then filter; float the paper on this liquid and hang up as in the former instance, but instead of merely washing it, float it for one minute on

THE ACID SOLUTION. { Pure Hydrochloric Acid 1 part, Distilled Water 40 parts.

Thence remove it into a vessel of clean water, and proceed to soak and wash as before. The result in both these instances is the same, but I am disposed to give a preference to the latter process, from many reasons, which however I need not here detail. I must however observe, that in the floating on the Acid, Prussic Acid is liberated, it should therefore only be conducted in a room where free circulation of air is procurable.

*To Sensitize the Iodized Paper* we employ two liquids, which should be kept ready prepared.

SATURATED SOLUTION OF GALLIC ACID. { Gallic Acid ½ drachm, Boiling Distilled Water 6 ounces, When cool, Filter.

ACETO NITRATE OF SILVER. { Nitrate Silver 30 grains, Glacial Acetic Acid *pure* 1 drachm, Distilled Water 1 ounce.

When these are required for use we take

SENSITIZING LIQUID { Gallic Acid Solution 10 minims, Distilled Water 1½ drachms, } Mix. Aceto Nitrate of Silver 10 minims Distilled Water 1½ drachms. }

N.B. This and the subsequent developing solution should be mixed only at the moment they are required, as they decompose by contact, *even without luminous influence;* the measures, glasses and rods must also be washed before being again employed.

Cause a sufficient quantity of this liquid to extend itself over a *perfectly clean* and level glass plate, apply the Iodized surface thereon for a few seconds, immediately transfer the paper on to some clean blotting paper, and pass a glass rod two or three times over its *excited surface,* then blot it off with more clean blotting paper, and transfer to the dark slide, where it may be retained several hours if required; the blotting paper will not serve for two operations; the liquid which has served for exciting one paper, must be thrown away and the glass cleaned previously to being employed for another operation.

In proportion to the dilution of these liquids will be the length of time the prepared paper will keep between the sensitizing and final development. Failures innumerable arise from too strong solutions. Mr. Talbot's specifiation of 1849 directs the aceto nitrate and gallic acid solutions to be used *without dilution;* in this state it is impossible to preserve them five minutes, spontaneous decomposition is set up even in total darkness.

Badly washed iodized paper is very fertile in producing failures, from the remaining iodide of potassium being sufficient to entirely saturate the small proportion of nitrate of silver employed, and thus produce a pure iodide of silver which is unacted on by light. The remedy in this instance is gradually to increase the dose of silver (that of gallic acid remaining constant) until the desired effect is produced.

The ordinary time of exposure in the camera for the paper prepared as above, and a good single lens, with a half inch diaphragm, is about five to seven minutes. It is not advisable to keep the paper prepared beyond twelve hours; excited in the morning it should be developed the evening of the same day.

To develope the picture, pour on to a glass plate, perfectly levelled, some gallic acid solution; lay the excited surface thereon for a few seconds, then remove the proof with its back on to some clean blotting paper, where leave it while another proof is being laid on the gallic acid; on returning to the first it will very probably give some slight indications of the picture; if so, pass the glass rod two or three times over the surface, to equalize the stratum of liquid, and pour along the rod, held close to one edge, sufficient aceto nitrate of silver (p. 43) to cover the sheet on its being distributed by means

of the glass rod. If the right exposure has been given, the picture will immediately begin to deepen, and within five to ten minutes will attain its maximum density. The development must be then stopped by washing with water, and the proof fixed by immersion in

| | |
|---|---|
| Hypo' Fixing Liquid. | Hyposulphite of Soda 1 ounce,<br>Warm Water 8 ounces |

Or,

| | |
|---|---|
| Cyanide Fixing Liquid. | Pure Cyanide Potassium 20 grains,<br>Distilled or Rain Water 10 ounces. |

Until the yellow colour has entirely disappeared.

Nothing now remains but to soak it some hours in water frequently changed, to dry it perfectly between blotting paper by means of a hot iron, and wax it to give it the necessary translucency.

The waxing is best effected by strewing the surface with finely scraped white wax, and ironing the proof between two pieces of bibulous paper, then remove it between two similar sheets of paper and repeat the process with the iron. The proof will then be ready for printing from.

This process is an exceedingly valuable one, and has, in *skilful hands*, produced results of great beauty. It enables us also to dispense with daylight in the production of positive proofs in the following manner.

Paper Sensitized as above, and *dried*, may be placed under the negative in a pressure frame, and after being exposed to the light from a good lamp, or a gas-jet for a minute, and developed, gives us a *positive* of a beautiful black tone, and almost in every respect equal to that obtained on the Chloride Paper, described in a former section. The difficulties, however, inherent in it, have decided the majority of Photographers in favor of the process next to be described.

## THE WAXED PAPER PROCESS.

To Wax Paper, obtain the *purest white wax*, (that ordinarily kept by Chandlers and Druggists, containing Spermaceti or Stearine, is not suitable) and a steel plate, similar to that used for engraving, or even a Druggist's Pill Tile; heat the latter by a bed of hot sand, or any suitable means, up to 212° to 230°, lay a sheet of Canson's Negative Paper thereon, and rub a cake of wax over it until it is sufficiently impregnated. Proceed thus until you have produced a sufficient stock. Each sheet is now to be placed between two other sheets of similar paper, enclosed in blotting paper, and ironed with a hot "box-heater," any excess of wax will be distributed to the clean sheets, and the centre *one* be now in a condition to receive its final ironing between blotting paper, (which for this purpose should be a fine sort) to give it uniform transparency.

The supplementary sheets seldom obtain sufficient wax, to serve without having some more added; they therefore may be heated on a future occasion by the hot plate. The remarks appended to the Albumenized and Iodized Paper, relative to home preparation, are here equally applicable.

| | | |
|---|---|---|
| Iodizing | Pure Iodide of Potassium, 4 drms.<br>Pure Bromide Do. ½ drachm<br>Pure Iodine 5 grains. | Mix dry and add thereto |
| Solution. | Grape Sugar, 50 grains<br>Sugar of Milk 4 drachms<br>Distilled Water 10 ounces. | Dissolved separately |

Pure Cyanide of Potassium Solution. quant: suff.

to decolorize almost entirely may then be added. Many operators replace the water by rice water, or whey of milk, but I do not think any benefit is derived therefrom. *Rice Water* is made by washing one ounce of best rice, thrice with distilled water, pouring thereon a pint of the same liquid, and just getting it to boil, straining off the liquid; after reposing twelve hours, strain the clear supernatant portion through fine cambric. *Whey*, by boiling a pint of fresh pure milk, then taking from the fire and stirring in 40 minims of pure Hydrochloric Acid, mixed with ½ ounce of water, the coagulum being then separated by straining

through muslin, leaves the whey comparatively clear; after reposing twelve hours, it may be filtered *bright* for use.*

Immerse the sheets one after the other in the iodizing liquid, as directed in salting paper, and allow them to soak twelve hours, covering the dish with a glass plate; when ready to take out, turn over the mass, and having ready a dish containing soft water, pass each sheet through it by immersing one edge and then drawing the paper through; finally hang them up by bent pins to dry on a line. They are generally tinged a color inclining to purple, and are to be preserved for use in a portfolio.

To Sensitize. Float each paper separately on the Aceto Nitrate Solution described in a former section, (having previously marked it to know which side is sensitive.) As soon as all color has entirely disappeared, it is sufficiently impregnated and may be drawn through water as before, and either blotted off for immediate use, or dried on a line. As this paper will keep excited several days, or even three or four weeks, it is sometimes convenient to prepare a *larger number* at once; this is done by *immersing* them in the

*No more than six sheets 11 by 9, should be immersed in the above quantity of liquid at one time; before putting in more the original color must be restored by adding Iodide. quant: suff.

Aceto Nitrate, leaving them a quarter of an hour, draining off the liquid, pouring in an equal quantity of soft water, and after repeating this twice, finishing by drawing through clean water singly as before. The washing waters may be saved for use in a future operation.

The sensitiveness and keeping qualities of this paper vary with the number of washings, the more it is washed, the longer it keeps, and is consequently the less sensitive; those sheets floated and used within a few hours of exciting, are nearly equal in sensitiveness to the Calotype paper before described.

They should be preserved between sheets of *pink* blotting paper in a close dark portfolio, pressed as tightly as possible to prevent the access of air, which, in large towns especially, always contains certain sulphur compounds which will entirely destroy their sensitiveness.

*The exposure in the Camera* with a Lens $2\frac{1}{2}$ inch diameter, 12 inch focus, $\frac{5}{8}$ inch diaphragm in good *diffused* light, will be five minutes and up.

When much washed for keeping during a journey, a quarter of an hour and upwards is required. After exposure in the Camera, the latter may be kept a considerable time before being developed; the former twelve hours.

To Develope. Plunge the sheets into a saturated solution of Gallic Acid, (see page 43) within ten minutes they should begin to give some definite idea of the picture, if they do so, pour off the solution and mix it with an equal volume of the *wash waters*; page 50, or if there be none, 1-10th of its volume of Aceto Nitrate, (that which has been once used for exciting is best reserved for this,) they must be lifted up from time to time, to examine by transmitted light, whether they are sufficiently developed, this they generally are, between one and two hours. The perfect result is known by all the half tones being perfectly brought out, without solarization, (i.e. opacity) of the high lights. If over exposed, the development will be much more rapid, and will be similar to that before explained in the Collodion process, (page 16.) If under exposed, before the picture has sufficiently come out, the whole surface becomes fogged or veiled, by the spontaneous decomposition of the developing liquid.

Some operators affirm that the addition of a piece of Camphor to the Gallic Acid solution tends to obviate the latter difficulty.

The development being completed, wash in a stream of water, and fix by immersion in Hypo', or in Cyanide as (vide page 28) when well washed as there indicated, dry

between blotting paper, and iron to restore the transparency lost during the repeated chemical manipulations.

The same process may be applied to *unwaxed paper*, with an equally good result, but the Iodizing must be completed in a much shorter time, (one hour,) and the paper merely blotted off for immediate use, as in the Calotype process, from which it differs little.

Extreme cleanliness in all the vessels, and perfect freedom from turbidity in the liquids is essential; they should all be filtered before use, except the silver solutions, which are best *poured off clear if it be possible.* Should the Aceto Nitrate require filtering, it will be best performed through a filter which has been already used for a silver salt, and kept in a *covered funnel* for the purpose; new paper always imparts some impurity to this liquid, which injuriously affects the keeping properties of the paper prepared therewith.

It is necessary to avoid touching these papers with the fingers, except at the corners, during any part of the process, as they infallibly leave stains.

# PART THE FOURTH.

## The Albumenized Glass Process, &c.

IODIZED ALBUMEN. ℞

- White of Egg 1 ounce.
- Distilled Water 1 drachm,
- Iodide Potassium 6 grains,
- Pure Grape Sugar, 10 grains

MIX the above materials in the order above indicated, beat them into a froth, and throw this into a funnel over which a piece of fine cambric has been spread, cover from dust and place in a warm situation until it has become perfectly liquid and strained through into a bottle placed beneath: allow the resulting material to subside for twelve hours, then pour off the clear portion for use.

Having carefully cleaned a glass plate as for the Collodion, pour on the iodized albumen, and return the excess into the bottle in precisely the same manner; the lower edge of the plate will be seen not to part readily with the remaining albumen. To effect this you must breathe upon that portion for a minute or more, and finish the draining by allowing this part of the plate to rest on a pad of blotting paper, placing it at an angle

against a support, so that the coated surface may be protected from dust while drying. As many plates can be thus prepared as may be desired while the albumen remains fresh; this stage of the operation is completed by drying each in its turn over a spirit lamp or wire gauze gas burner, taking care to apply the heat cautiously at first round the edges, and gradually to diminish the circle until the centre is dry.

The plates are excited by cautiously applying the iodized surface to that of a solution thus made:

{ Nitrate of Silver 50 grains,
Distilled Water 1 ounce,
Pure Glacial Acetic Acid 1 drachm,

and allowing it to remain in contact one minute; it is then washed by pouring a gentle stream of distilled water over it—and, after being allowed to dry spontaneously, may be put into a plate box and preserved for use precisely as if it were a piece of sensitive waxed paper. The time of exposure in the camera is about the same as for the latter, and the development is conducted in much the same manner; the surface being well moistened with solution of gallic acid, the plate is allowed to rest upon the level stand until the details begin to appear; the solution is then mixed with a few drops of the aceto nitrate, and when the picture is judged sufficiently brought out, it

is washed with water, fixed with hyposulphite of soda, and freed therefrom by frequent rinsings as in the former processes. From the great attention paid in this country to the Collodion, and the high degree of excellence attained therewith, the above process has not received much attention, and, I think, with reason; I know of no effect produced with albumen which cannot be obtained on Collodion; the beautiful transparent positive proofs for the Stereoscope now so well known, may be brought out equally well upon Collodion with one half the trouble and waste of time; and, by means of Mr. Shadbolt's process, any number of Collodion plates may be prepared, used and developed any time *within twenty-four hours*. I shall now proceed to illustrate these invaluable modifications of the Collodion process.

MR. SHADBOLT'S DRY COLLODION PROCESS.

Excite a plate in the ordinary manner, on taking it from the nitrate bath, hold it in a slanting position, and pour over its surface a quantity of the following syrup sufficient to displace all the free silver solution: drain this off and replace by another portion of syrup, and allow it to repose on the level stand during the preparation of the next plate.

SHADBOLT'S SYRUP. { *Grape Sugar 6 ounces, Distilled Water 4 ounces, Alcohol 1 ounce, } Mix and Filter.

* I have here substituted Grape Sugar for Honey, recommended by Mr. S. from the greater facility it offers for filtration when well prepared.

After thoroughly draining on blotting paper, these plates may be preserved several hours if kept in a close box. The mode of developing is to first wash with distilled water, to extract a large portion of the sugar, then pour over the surface the usual pyrogallic solution, and when the picture begins to appear, add to the developing liquid, poured off into the measure, one-sixth its volume of the nitrate bath, and then proceed as in the ordinary manner. The exposure in the Camera is from three to five times as long as is required by plates prepared in the ordinary manner; this would be a disadvantage in portrait taking, but by no means the case in landscape.

## POSITIVES (BY TRANSPARENCE) ON COLLODION.

Procure a negative on glass somewhat tinged with red (slightly over exposed), avoiding those which are too dense, or whose contrasts of light and shade is very marked; gum round the edges slips of *thin* paper, and varnish the whole. Having a sensitive plate ready, place it beneath the negative, and expose to the light of a lamp or a gas flame at a distance of twelve inches from three to five seconds; develope with pyrogallic acid 1½ grains, acetic acid 1 drachm, water 1 oz. If the exposure to light has been sufficient, the lights will remain very transparent, and

the black become exceedingly dense; should it be desirable to render them more so, treat the picture by pouring over it a small quantity of

| | | |
|---|---|---|
| CHLORIDE OF GOLD AND AMMONIUM. | Chloride Gold 3 grains,<br>Pure Chloride Ammonium 3 grains,<br>Water 3 ounces. | |

after fixing with Cyanide and well washing.

## MR. MAXWELL LYTE'S INSTANTANEOUS PROCESS.

An excited collodion plate is further prepared by pouring over its surface a syrup composed as follows:

| | | |
|---|---|---|
| LYTE'S SACCHARINE SILVER BATH. | Nitrate of Silver 200 grains,<br>Distilled Water 12 ounces,<br>*Old Crystallized Honey 8ounces,<br>Alcohol 1 ounce, | Mix and Filter. |

"in *diffused* daylight, then carry the liquid into the dark room and filter through animal charcoal till colourless; place a lump of camphor in the bottle, and let it stand a short time, and it is ready for use."* * * "The plate thus prepared is exceedingly sensitive, inasmuch that I have taken with a landscape lens and small diaphragm ships sailing and waves breaking." The above is Mr. Lyte's own description of his process. He finds that in the south

* I find pure Grape Sugar here also preferable; it obviates the necessity of filtration through charcoal.

of France, his plates retain their sensitiveness about an hour, in England, sometimes four or five. Up to the present time small success has followed trials of this process in England; I can however personally answer for the correctness of the principle involved, and have myself seen many pictures produced thereby, they surpassed anything I had previously seen.

## STEREOSCOPIC PICTURES.

These are now too well known to require a description at my hands; their effect, as viewed in the instrument, is to reproduce perfectly (when the angle is not exaggerated) the object as it appears before our eyes in nature. As to the relative angle at which the two pictures should be taken, authorities differ widely; some contend, and with great justice, that the distances between the lens taking one picture and that copying the other, should be invariably $2\frac{1}{2}$ inches, or the space between the pupils of the eyes; while others would have the angle included between lines joining the object, and each lens maintained invariable.

The former would wish every object in nature represented as *they see it.* The latter as it would appear were it represented by a small model, placed at a distance of a few feet. I certainly am more inclined to the latter view of the case, distant objects

*in nature do not stand out* with great relief, but if we obtain two pictures of them at the same angular distance as would be the case if we had a perfect model five feet from our eyes, I cannot but think a much more pleasing effect is produced.

There is a convenient form of instrument for satisfying the first category of operators. A single Camera with its lens is mounted on a modified parallel ruler, capable of moving in a restricted arc of a circle, and this being furnished with a double slide, enables both pictures to be taken on one plate; it also serves admirably for all near objects, portraits, &c. For distant views I find that if the two stations whence the pictures are taken differ half an inch laterally, for every foot between them and the object, the object of the latter class is obtained in a most perfect manner. An excessive angle is to be avoided, near objects are thrown out of perspective in the most disagreeable manner, and landscapes appear no better than we see them represented on the stage.

*Nov.* 1854.

FINIS.

# WEIGHTS AND MEASURES MENTIONED IN THIS WORK.

| | | | |
|---|---|---|---|
| 60 Grains | = | 1 drachm | } APOTHECARIES WEIGHT. |
| 8 drachms | = | 1 ounce | |

Sixteen ounces Apothecaries weight, equal nearly 17½ ounces Avoirdupois, by which all goods are *sold retail*. N.B. This latter ounce is not *practically* divisibly below the quarter.

| | | | |
|---|---|---|---|
| 60 minims or drops | = | 1 drachm | } FLUID MEASURE. |
| 8 drachms | = | 1 ounce | |
| 20 ounces | = | 1 pint | |

When drops are mentioned, minims (measured drops) are intended. Liquids are to be dispensed by the *fluid* measure in English formulæ; in French, on the contrary *weight* is employed when the gramme or its multiples is directed. All subdivisions of the English ounce should be understood as applying to the apothecaries' ounce only.

## THE FOLLOWING MEMS. MAY BE USEFUL.

| | | | |
|---|---|---|---|
| 1 Gramme, French | = | say 15½ Grains, | English |
| 1 Kilo ,, | = | ,, 2lb. 3oz. Avoirdupois, | English |
| 1 Litre ,, | = | ,, 1¾ Pint Fluid, | ,, |
| 1 Metre ,, | = | ,, 39⅜ Inches | ,, |
| 3 Centi Metres, | = | ,, 1¼ Inch | |
| 6 Milli Metres | = | ,, ¼ Inch | |